

Appl. No. 10/027,667
Atty. Docket No. 8828
Amdt. dated 13-Dec-04
Reply to Office Action of 08/13/2004
Customer No. 27752

REMARKS

Claims 1-93 are pending in the present application. No additional claims fee is believed to be due.

Claims 1, 28, 32, 59, 63 and 90 have been amended to particularly point out and distinctly claim the subject matter that the Applicants regard as their invention. Support for the amendments is found throughout the specification and claims, as originally filed. No new matter has been introduced.

It is believed these changes do not involve any introduction of new matter. Consequently, entry of these changes is believed to be in order and is respectfully requested

Claim Objections

The Office Action states that claims 28, 59 and 90 are objected to because of the following informalities: the claims recite "the porous anode" which does not appear to have proper antecedent basis except in the previous claim, not in the independent claim. The Office Action states that claim 28 should depend from claim 27, claim 59 should depend from claim 58 and claim 90 should depend from claim 89. The Applicants respectfully direct the Examiner's attention to the "Amendments" section of the instant paper, in which the Applicants have amended claims 28, 59 and 90 to change the dependency of the above-listed claims, and thus, obviate the above-described claim objections. In light of the present amendments, the Applicants respectfully request reconsideration and withdrawal of the objections to claims 28, 59 and 90.

Rejection Under 35 USC 102 Over Kelley

The Office Action states that claims 1 and 3 are rejected under 35 USC 102(e) as being anticipated by US Patent Number 6,306,281 to Kelley (hereinafter "Kelley"). Specifically, the Office Action states that Kelley teaches an apparatus for electrolyzing an electrolytic solution including a non-membrane (barrier) cell including an anode and cathode defining a passage formed there between, an inlet port, an outlet port and a direct current supply that delivers less than 3-12 volts that uses less than 5 amps of current. The Applicants respectfully disagree with the finding of anticipation.

Initially, the Applicants wish to note that claims 1 and 3 of the instant application are limited to electrolysis devices that use a direct current supply that delivers less than 5 watts of power. The Applicants further note that, in order to determine the wattage of a device, it is necessary to multiply the number of volts by the number of amps of the subject device. The

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Applicants direct the Examiner's attention to Example 7 of Kelley. The example clearly discloses that the subject electrolysis device functions on 2.6 amps and 6 volts of power – resulting in a total of 15.6 watts. The Kelley reference fails to disclose any electrolysis device having a total watts requirement of less than 15.6. Claims 1 and 3 of the present application are clearly limited to devices adapted to operate on a power requirement of less than 5 watts. Thus, Kelley fails to anticipate each and every element of the claims of the present application. Accordingly, the Applicants respectfully request reconsideration and withdrawal of the rejection to claims 1 and 3 under 35 USC 102(e).

Rejection Under 35 USC 103(a) Over Kelley

Claims 4, 22, 23, 32, 34, 35, 53 and 54 have been rejected under 35 USC 103(a) as being unpatentable over Kelley. Specifically, the Office Action states that it would have been obvious to one of ordinary skill in the art to make the electrolytic cell of Kelley small enough to have an anode surface area of less than 30cm² in order to adjust the total output of the cell to the desired amount. The Office Action further states that it would have been obvious to one of ordinary skill in the art to have recirculated the electrolytic solution because recycling is an obvious engineering design improvement that comes from efficiency and economic design considerations. Finally, the Office Action states that it would have been obvious to one of ordinary skill in the art to add a water sensor for automatically turning the electrolytic cell on and off because such an automatic switch is an obvious engineering design improvement.

The Applicants respectfully disagree with the finding of obviousness, as described above. The Applicants wish to renew their previous arguments presented in relation to the rejection under 35 USC 102(e), above. Namely, Kelley fails to include any example or disclosure demonstrating the use of an electrolysis device that operates on a power requirement of less than 5 watts. Rather, the Kelley reference is limited entirely to devices that operate on a wattage requirement of greater than 15.6 watts. The Applicants submit that the power requirement disclosed by Kelley would prohibit the use of an anode with a small surface area. The surface area of the Kelley anode is needed to produce the level of power disclosed by Kelley, and to accommodate the high buffer agent and acid composition disclosed by Kelley. The Applicants submit that modification of the Kelley device to lower the surface area of the subject anode would render the device inoperable. In light of the high power requirements of Kelley, which are clearly outside the range of the claimed electrolysis devices, the Applicants submit that it would not have been obvious to modify the recirculation and water sensing characteristics of the Kelley device either. Accordingly, the Applicants respectfully request reconsideration and withdrawal of the rejection to claims 4, 22, 23, 32, 34, 35, 53 and 54 under 35 USC 103(a).

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Rejection Under 35 USC 103(a) Over Kelley in view of Spence

Claims 63, 64, 65, 66 84 and 85 are rejected under 35 USC 103(a) for being unpatentable over Kelley in view of US Patent Number 4,414,070 to Spence (hereinafter "Spence"). Specifically the Office Action states that it would have been obvious to modify the apparatus of Kelley to use as small an anode-cathode gap as possible, such as less than 0.6 mm as claimed because Spence teaches that decreased anode-cathode gap improves efficacy. The Office Action further states that it would have been obvious to add a pump, a recirculation means and a water sensor to the device of Kelley.

The Applicants respectfully disagree with the finding of obviousness. The Applicants wish to reiterate that the lowest power requirement disclosed by Kelley is 15.6 watts. This power requirement is disclosed by Example 7 of Kelley, which indicates that the subject device operates on 2.6 amps and 6 volts of power. Spence discloses nothing with respect to the power requirements of an electrolysis device. Conversely, claim 63, from which claims 64, 65, 66, 84 and 85 ultimately depend, clearly discloses that the claimed device is adapted to operate on a direct current power supply with less than about 5 watts. Thus, the Applicants submit that it would not have been obvious to modify the Kelley reference in the above-described manner as even the intended modifications would fail to yield an electrolysis device that is adapted to operate at a power requirement of less than about 5 watts, as claimed by the present invention. Accordingly, the Applicants respectfully request reconsideration and withdrawal of the rejection to claims 63, 64, 65, 66, 84 and 85 under 35 USC 103(a) over Kelley in view of Spence.

Rejection under 35 USC 103(a) over Herrington

Claims 1-4, 22-24, 29-31, 32-35, 53-55 and 60-62 are rejected under 35 USC 103(a) as being unpatentable over US Patent 6,261,464 to Herrington (hereinafter "Herrington"). Specifically, the Office Action states that it would have been obvious to adapt the batch-type process of Herrington to the continuous process of the claimed invention. The Office Action further states that it would have been obvious to construct an apparatus comprising a body containing the electrolytic cell and power supply, a current supply such as a battery or solar cell, a travel water purification device, a pump to cause the electrolyte to flow through the electrolytic cell, a recirculation means, a water sensor and an anode with a small surface area.

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The Applicants respectfully direct the Examiner's attention to the "Amendments" section of the instant paper, in which the Applicants have amended claims 1 and 32, from which claims 2-4, 22-24, 29-31, 33-35, 53-55 and 60-62. Amended claims 1 and 32 now recite that the subject electrolysis device comprises a gap size of less than about 0.6 mm. Support for this amended is found in original claim 63. The Applicants have further amended claims 1 and 32 to recite that the claimed electrolysis device is adapted to accommodate a level of chloride salt in the aqueous feed solution of from about 1 ppm to about 500 ppm. Support for this amendment is found at page 5 of the present specification. In light of the present amendments, the Applicants submit that Herrington neither teaches nor suggests each and every limitation of the present claims, as amended. Rather, Herrington discloses that the subject feed solution comprises a minimum of 30,000 ppm of choride salt. The Applicants submit that the high concentration of the feed solution disclosed by Herrington would cause an electrolysis device with a small gap between the anode and cathode to short – thereby rendering the modified device inoperable. Accordingly, the Applicants request reconsideration and withdrawal of the rejection to claims 1-4, 22-24, 29-31, 33-35, 53-55 and 60-62.

Rejection Under 35 USC 103(a) Over Herrington in view of Weakly

Claims 5-21 and 36-52 are rejected under 35 USC 103(a) as being unpatentable over Herrington in view of US 2002/0157966 to Weakly (hereinafter "Weakly"). Specifically, the Office Action states that it would have been obvious to modify the apparatus of Herrington to include the filter material of Weakly because the secondary reference teaches that the filter removes arsenic from the treated water which would have minimized contaminants for the end user of the treated water of the process of Herrington.

The Applicants respectfully disagree with the finding of obviousness. The Applicants direct the Examiner's attention to the "Amendments" section of the instant paper, in which the Applicants have amended claims 1 and 32, from which claims 5-21 and 36-52 ultimately depend, to recite that the gap size between the anode and cathode is less than about 0.6mm. Further, the Applicants have amended claims 1 and 32 to recite that the claimed electrolysis device is adapted to accommodate a level of chloride salt in the aqueous feed solution of from about 1 ppm to about 500 ppm. In light of the present amendments, the Applicants submit that the combination of Herrington and Weakly fails to teach or suggest each and every limitation of the above-listed claims, as amended. Specifically, Herrington is limited to devices having a large gap size and a high concentration of salt in the aqueous feed solution (greater than 30,000 ppm). The secondary reference of Weakly fails to address the shortcomings associated with Herrington. Accordingly,

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the Applicants request reconsideration and withdrawal of the rejection to claims 5-21 and 36-52 under 35 USC 103(a).

35 USC 103(a) Over Herrington in view of Beer

Claims 25-26 and 56-57 are rejected under 35 USC 103(a) as being unpatentable over Herrington in view of US Patent Number 3,632,498 to Beer (hereinafter "Beer"). Specifically, the Office Action states that it would have been obvious to use the composite electrode of Beer for the anode of Herrington because the electrode of Beer is useful in water purification and has a long life, low overvoltage and catalytic properties.

The Applicants respectfully disagree with the finding of obviousness. The Applicants direct the Examiner's attention to the "Amendments" section of the instant paper, in which the Applicants have amended claims 1 and 32, from which claims 25-26 and 56-57 ultimately depend, to recite that the gap size between the anode and cathode is less than about 0.6mm. Further, the Applicants have amended claims 1 and 32 to recite that the claimed electrolysis device is adapted to accommodate a level of chloride salt in the aqueous feed solution of from about 1 ppm to about 500 ppm. In light of the present amendments, the Applicants submit that the combination of Herrington and Beer fails to teach or suggest each and every limitation of the above-listed claims, as amended. Specifically, Herrington is limited to devices having a large gap size and a high concentration of salt in the aqueous feed solution (greater than 30,000 ppm). The secondary reference of Beer fails to address the shortcomings associated with Herrington. Thus, even the intended combination of references would fail to yield an electrolysis device having each and every limitation of the claimed invention, as amended. Accordingly, the Applicants request reconsideration and withdrawal of the rejection to claims 25-26 and 56-57 under 35 USC 103(a).

Rejection Under 35 USC 103(a) Over Herrington in view of Graham

Claims 27-28 and 58-59 are rejected under 35 USC 103(a) as being unpatentable over Herrington in view of US Patent Number 5,937,641 to Graham (hereinafter "Graham"). Specifically, the Office Action states that it would have been obvious to use the porous material of Graham for the anode of Herrington because the porous material of Graham resists vibrations and provides a high surface contact area for electrolytic reaction.

The Applicants respectfully disagree with the finding of obviousness. The Applicants direct the Examiner's attention to the "Amendments" section of the instant paper, in which the Applicants have amended claims 1 and 32, from which claims 25-28 and 58-59 ultimately

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depend, to recite that the gap size between the anode and cathode is less than about 0.6mm. Further, the Applicants have amended claims 1 and 32 to recite that the claimed electrolysis device is adapted to accommodate a level of chloride salt in the aqueous feed solution of from about 1 ppm to about 500 ppm. In light of the present amendments, the Applicants submit that the combination of Herrington and Graham fails to teach or suggest each and every limitation of the above-listed claims, as amended. Specifically, Herrington is limited to devices having a large gap size and a high concentration of salt in the aqueous feed solution (greater than 30,000 ppm). The secondary reference of Graham fails to address the shortcomings associated with Herrington. Thus, even the intended combination of references would fail to yield an electrolysis device having each and every limitation of the claimed invention, as amended. Accordingly, the Applicants request reconsideration and withdrawal of the rejection to claims 27-28 and 58-59 under 35 USC 103(a).

Rejection Under 35 USC 103(a) over Herrington, or Herrington in view of Weakly, or Herrington in view of Beer, or Herrington in view of Graham, in further view of Spence

Claims 63-93 are rejected under 35 USC 103(a) as being unpatentable over Herrington, Herrington in view of Weakly, or Herrington in view of Beer, or Herrington in view of Graham, in further view of Spence. Specifically, the Office Action states that it would have been obvious to modify the apparatus of Herrington to use as small an anode-cathode gap as possible, such as less than 0.6 mm as claimed, because Spence teaches that decreased anode-cathode gap improves efficiency.

The Applicants direct the Examiner's attention to the "Amendments" section of the instant paper, in which the Applicants have amended claim 63, from which claims 64-93 ultimately depend, to recite that the claimed electrolysis device is adapted to accommodate a level of chloride salt in the aqueous feed solution of from about 1 ppm to about 500 ppm. Support for this amendment is found on page 5 of the present specification. In light of the present amendments, the Applicants submit that none of the attempted combinations of references teach or suggest each and every limitation of the above-listed claims, as amended. Specifically, Herrington is limited to devices having a high concentration of salt in the aqueous feed solution (greater than 30,000 ppm). The secondary references of Weakly, Beer, Graham and Spence fail to address the shortcomings associated with Herrington. Thus, even the intended combination of references would fail to yield an electrolysis device having each and every limitation of the claimed invention, as amended. Accordingly, the Applicants request reconsideration and withdrawal of the rejection to claims 63-93 under 35 USC 103(a).

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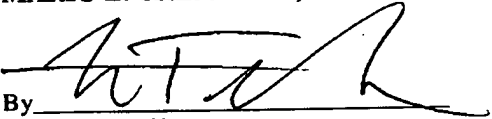
Conclusion

In light of the above remarks, it is requested that the Examiner reconsider and withdraw the rejections under 35 USC 102 and 103. Early and favorable action in the case is respectfully requested.

Applicants have made an earnest effort to place their application in proper form and to distinguish the invention as now claimed from the applied references. In view of the foregoing, Applicants respectfully request reconsideration of this application, entry of the amendments presented herein, and allowance of Claims 1-93.

Respectfully submitted,

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